

CONTENTS

	Page
1. INTRODUCTION	1
1.1. Purpose and Approach of This Study	2
1.2. Organization of This Report	3
2. INTERFERENCE SIGNALS	4
2.1. Signal Description	4
2.1.1. Direct-Sequence Ultrawideband.....	4
2.1.2. Dithered-Pulse Ultrawideband	6
2.1.3. Multi-Band OFDM Ultrawideband	7
2.1.4. Gated Gaussian Noise	9
2.2. Computer Simulation.....	10
2.2.1. Reduction of System Complexity.....	10
2.2.2. Reduction of Samples.....	12
2.3. Implementation on the Vector Signal Generator	13
3. INTERFERENCE CHARACTERIZATION MEASUREMENTS.....	14
3.1. Metrics and Data Needed to Compute Them	14
3.2. Description of Test and Measurement Equipment	14
3.2.1. Vector Signal Analyzer	14
3.2.2. Spectrum Analyzer.....	16
3.2.3. Digital Oscilloscope	17
3.2.4. Power Meter	18
4. VICTIM RECEIVER	19
4.1. Satellite Digital Television Description.....	19
4.1.1. MPEG-2 Encoder	19
4.1.2. Forward Error Correction and Modulation	19
4.1.3. Receiver.....	20
4.2. DTV Quality Metrics	21
4.3. Operational Scenario Chosen for DTV Interference Susceptibility Tests	22
4.4. Satellite Signal Simulation	23
5. INTERFERENCE SUSCEPTIBILITY TESTS.....	24
5.1. Methodology.....	24
5.2. Test System.....	24
5.3. Procedures	26
5.3.1. Calibration.....	26
5.3.2. DTV Quality Metric Acquisition	26
6. SUMMARY	27
7. ACKNOWLEDGMENTS	28
8. REFERENCES	29

APPENDIX A: MATHEMATICAL SIGNAL DESCRIPTION.....	31
A.1. Direct-Sequence Ultrawideband	31
A.2. Dithered-Pulse Ultrawideband.....	32
A.3. Multi-Band OFDM Ultrawideband	33
A.4. Gated Gaussian Noise.....	35
APPENDIX B: VECTOR SIGNAL GENERATOR OPERATION	36
B.1. Operation in the Dual AWG Mode	36
B.2. Techniques to Optimize RF Output Performance.....	37
B.3. Waveform Conditioning	39
B.4. Operating Procedures.....	40
APPENDIX C: EFFECTS OF VSG LO FEED-THROUGH ON DTV INTERFERENCE SUSCEPTIBILITY TESTS	41
C.1. LO Feed-Through Inherent to DTV Systems	41
C.2. Experiment.....	43
C.3. Results.....	44
C.4. Effect of VSG LO Feed-Through on Carrier-Suppression Ratio.....	46
C.5. Conclusion	47
APPENDIX D: ESTIMATING AND GRAPHING THE AMPLITUDE PROBABILITY DISTRIBUTION OF COMPLEX-BASEBAND SIGNALS.....	48
D.1. Estimating the APD	48
D.2. Plotting the APD.....	49
D.3. Testing the Routines	50
D.4. Additional Comments	50
D.5. MATLAB Code	52
APPENDIX E: DYNAMIC RANGE OF THE VECTOR SIGNAL ANALYZER	54
E.1. Dynamic Range Measurement	54
E.2. Average Power Measurements of Fundamental Signals	54
E.3. APD Measurements of Fundamental Signals.....	55
E.4. Conclusion.....	55
APPENDIX F: TEST SYSTEM CHARACTERIZATION.....	61
F.1. Characterization of the Signal Paths.....	61
F.2. Dynamic Range of Interference Signal Path Cascaded with the VSA	63
F.3. Intermodulation Products in Satellite Signal Generator	63
APPENDIX G: HARDWARE SPECIFICATION	66
G.1. Interference Generation Subsystem	66
G.2. Calibration Subsystem/Test and Measurement Equipment	67
G.3. Satellite Simulation Subsystem	68
G.4. Coupling Subsystem	70
G.5. Receiver Subsystem.....	71
APPENDIX H: GLOSSARY	72